

Date: Sun, 13 Jun 93 04:30:02 PDT  
From: Packet-Radio Mailing List and Newsgroup <packet-radio@ucsd.edu>  
Errors-To: Packet-Radio-Errors@UCSD.Edu  
Reply-To: Packet-Radio@UCSD.Edu  
Precedence: Bulk  
Subject: Packet-Radio Digest V93 #167  
To: packet-radio

Packet-Radio Digest                      Sun, 13 Jun 93                      Volume 93 : Issue 167

Today's Topics:

  ampr.org  
                Digital microwave project (2 msgs)  
  FAQ ??

Send Replies or notes for publication to: <Packet-Radio@UCSD.Edu>  
Send subscription requests to: <Packet-Radio-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Packet-Radio Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/packet-radio".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.  
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Date: 13 Jun 1993 07:06:41 GMT  
From: olivea!inews!ilx018.intel.com!ilx049!dbraun@uunet.uu.net  
Subject: ampr.org  
To: packet-radio@ucsd.edu

What is "ampr.org" an abbreviation for? If all Ham radio  
internet addresses belong to this domain (?), why is it necessary?  
Will the Internet-with-a-big-I understand these forms of addresses?

Sorry, I am rather ignorant of all the internet addressing-routing-etc.  
thoery.

--

Doug Braun (N10WU)

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Email:                      dbraun@iil.intel.com  
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	Mendham, NJ 07945	IDC1-41	
		Matam Scientific Center	
		Haifa, Israel	31015

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"There is no human problem which could not be solved if  
people would simply do as I advise." -- Gore Vidal

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Date: Sat, 12 Jun 1993 16:02:00 GMT  
From: usc!howland.reston.ans.net!europa.eng.gtefsd.com!emory!kd4nc!ke4zv!  
gary@network.UCSD.EDU  
Subject: Digital microwave project  
To: packet-radio@ucsd.edu

In article <C8FqJs.1Hr@zeno.fit.edu> ree88132@zach.fit.edu (Keith Ledig) writes:

>I am about to embark on a project that involves the use of microwaves  
>to transfer digital data. Not being very experienced in microwave  
>technology I have a few questions to ask the microwave gurus. First,  
>a little background: This project will link two computers together  
>through their serial ports at initially 9600 baud but later at speeds  
>of up to 115K baud. The eventual goal is to use SLIP through this  
>connection to get onto the network. The distance will be approx.  
>10 to 15 miles.

>

>1. Where is a good place to get cheap microwave components from?

Hamfests, fleamarkets, the dumpsters of phone companies, TV stations,  
and the power company are the cheapest sources. Advanced Receiver  
Research sells new 10 GHz and 24 GHz Gunnplexers, but I wouldn't  
call them cheap, about \$400 for 10 milliwatts.

>2. What frequencies can be used for this microwave link? HAM?

Naturally, microwave links use microwave frequencies, duh. For  
speeds from 1200 to 56 kilobaud, any ham band above 222 MHz will  
do. That's UHF. For speeds greater than 56 kb, any ham band above  
450 MHz will do. Commercial terrestrial links are generally found  
in the 4-7 GHz range.

> Are there allocated frequencies for such experimentation and  
> do they require a license?

All the bands, except the 900 MHz Part 15 band require licenses, and

it's limits aren't suitable for your project. Naturally the ham bands require a ham license. Most of the commercial frequencies are in heavy use. You have to go through a coordinating body to get an allocation approved before the FCC will consider a license in the commercial services. This can be expensive and time consuming. An experimental license is less restrictive, but one will be issued only "for cause" by the Commission. You have to give them a written proposal detailing the types of experiments you intend to undertake. If they consider it interesting, and if they agree that no other type of license is suitable, they'll issue you an experimental license, but the burden is on you not to interfere with any other licensed user.

- >3. If I want full duplex, do I need 2 antennas at each end or can  
> one serve as a bidirectional with 2 separate frequencies used?
- >4. Can one antenna be used to transmit AND receive (related to question  
> 3 and 5).

It depends on the type of feed system you use, and on whether you wish to operate split frequency or not. Split frequency operation is common in amateur use, the dish doesn't care, and the feed doesn't care as long as the two frequencies are in the same band. Commercial practice is usually to operate on the same frequency, but with different polarization. Satellite systems operate this way with half the transponders running vertical polarization, and the other half on the same frequencies but horizontally polarized. Left and right hand circular polarization can also be used. A single feed can be used for both polarizations by suitable design. You can use two dishes and two feeds on two different frequencies if you wish, but it's inefficient to do so.

- >5. Which antenna do I use? Horn? Dish? (related to question 2 about  
> frequency).

For your application, a dish is preferred. Practical horns with more than 17 db of gain are difficult to manage mechanically. Doing cross polarization with a single pyramidal horn is also tricky. You'll likely want to use a sector feed at the focus of a dish.

- >6. Has this been done before with personal/amateur setup?

Sure. See the 1993 ARRL Handbook, or one of the Computer Networking Conference Proceedings, also available from the ARRL.

- >7. Where can I find out more info on this stuff?

See above, and also the RSGB microwave books will be useful for the RF part of setting up the link.

- >8. What security considerations are necessary? I will probably want

- > to encrypt/scramble so eavesdroppers can't get system passwords etc.
- > Is there data encryption on a chip available?

Encryption is illegal on the amateur bands, but it's fine on commercial links. DES chipsets are available, but there are better, and cheaper, ways of insuring communications privacy. On the cheaper end, a simple data scrambler using a tapped shift register should supply the minimal security you probably really need when coupled with the tight beam point to point nature of your link. On the high end are certain public key systems that the government doesn't like because even they can't break them. This can be implemented in software, so your hardware costs can be kept to a minimum.

- >9. Is it feasible to use data compression or correction like v.42 and v.42bis? I have seen it on a chip but have never used it before.
- > Are these chips very expensive? Is there a real easy way to error correct that's cheap?

KA9Q has an experimental forward error correction scheme for NOS that he writes about in this month's QEX. It requires no special hardware other than a 33 MHz 486 host to implement at 56 kb. There are dedicated chipsets available as well, but they aren't cheap yet.

- >10. Since I'll be using SLIP at my end I guess the other end can be hooked up to any machine on the network? (ie. a SUN, but what about an IBM PC or Amiga that is not running UNIX?)

Run the appropriate KA9Q NOS variant for the platform. There are versions for PCs, Mac, Amiga, and who knows what else floating around. This is a good plan for interoperating with any network since NOS can switch packets from radio, wireline, or ethernet at will. The Telebit Netblazer is nothing more than a customized PC running a hacked version of NOS.

- >I know this sounds really complicated but that's why I want to do this.
- >Plus it can be very useful, but I don't have too many high hopes on getting on the network because of the network administrators security concerns.

This isn't that complicated, some of us are interconnecting networks with this technology today. 56 kb RF modem kits are available from GRAPES, 19.2 kb radio links are available from Kantronics, and 9600 baud links are available from a number of sources. Commercial T1 rate microwave equipment is also available from a number of vendors, or you can try the system described in the Handbook. 15 mile line of sight microwave paths are duck soup. Even an eye safe laser and a 6 inch telescope would be suitable for the task, and lightwave communications is still license free.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

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Date: Sun, 13 Jun 1993 04:27:58 GMT  
From: swrinde!emory!athena!aisun3.ai.uga.edu!mcovingt@network.UCSD.EDU  
Subject: Digital microwave project  
To: packet-radio@ucsd.edu

The possible approaches to licensing would be...

- (1) A ham license, IF the project is 100% NON-COMMERCIAL and not business-related in any way.
- (2) The FCC has a special licensing program for school projects.
- (3) Otherwise, there is FCC experimental licensing for commercial users...

--

:- Michael A. Covington, Associate Research Scientist		:	*****
:- Artificial Intelligence Programs		mcovingt@ai.uga.edu	: *****
:- The University of Georgia		phone 706 542-0358	: * * *
:- Athens, Georgia 30602-7415 U.S.A.		amateur radio N4TMI	: ** *** ** <><

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Date: Fri, 11 Jun 1993 19:05:48 GMT  
From: sdd.hp.com!col.hp.com!news.dtc.hp.com!hpscit.sc.hp.com!hplextra!hpfcsol!hplvec!tcline@network.UCSD.EDU  
Subject: FAQ ??  
To: packet-radio@ucsd.edu

> In rec.radio.amateur.packet, sjg@phlim.ph.kcl.ac.uk (Simon Gornall) writes:  
>  
> I'm looking to get into packet basically for internet access. I've  
> been searching around for FAQ's, but I can't find one for this group.  
> Is there an ftp site that carries it ?  
>  
> Simon.

and also:

> From: dbraun@ilx049.intel.com (Doug Braun)

> Date: Thu, 10 Jun 1993 13:17:24 GMT  
> Subject: TNC question  
> Newsgroups: rec.radio.amateur.packet  
>  
> Is there a FAQ for packet? All I know is what I read in the  
> ARRL Operating Guide (which is a very handy book!).  
>  
> Doug Braun (N10WU)

I hope the following helps.

73

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Ted Cline, NØRQV  
ted\_cline@hpisla.lvld.hp.com  
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VOICE: (303) 679-2352  
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VXI Systems Division  
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Loveland, CO 80537 USA  
-----

> From: steve@wattres.SJ.CA.US (Steve Watt -- KD6GGD)  
> Date: Mon, 22 Feb 1993 22:51:31 GMT  
> Subject: rec.radio.amateur.packet Frequently Asked Questions  
> Newsgroups: rec.radio.amateur.packet,rec.radio.info,rec.answers,news.answers  
> Reply-To: packet-faq@wattres.SJ.CA.US (Packet Radio FAQ Coordinators)  
> Expires: 03/29/93  
> Summary: Common questions and answers about Packet Radio.  
>  
> Frequently Asked Questions for Amateur Packet Radio  
>  
> Version 1.13 - Last modified 2/21/93  
>  
> The Packet Radio FAQ's will be posted on a monthly basis to  
> rec.radio.amateur.packet. The current version of this document is  
> available via anonymous FTP at ftp.cs.buffalo.edu.  
>  
> Many FAQ's, including this one, are available on the archive site  
> rtfm.mit.edu in the directory pub/usenet/news.answers. The name under  
> which a FAQ is archived appears in the Archive-Name: line at the top  
> of the article. This FAQ is archived as radio/packet-faq.  
>  
> There is also a mail server on rtfm.mit.edu, which can be addressed as  
> mail-server@rtfm.mit.edu. For details on how to operate this server,  
> send a message to that address with the word "help" in the BODY of the  
> message.

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Date: Sat, 12 Jun 1993 12:41:23 GMT  
From: swrinde!cs.utexas.edu!math.ohio-state.edu!magnus.acs.ohio-state.edu!  
usenet.ins.cwru.edu!neoucom.edu!wtm@network.UCSD.EDU  
To: packet-radio@ucsd.edu

References <dmcreyne-110693082520@134.5.142.4>,  
<1993Jun11.150745.9462@uhura.neoucom.edu>, <C8HLxB.BH2@zeno.fit.edu>u  
Subject : Re: Digital microwave project

Microwave polarization is controlled by the geometry of the waveguide aperture and the orientation of the element delivering the energy to the structure. Fancy waveguide sections can be used to duplex several different polarizations into a common horn. Depending on reflector dish used, you can mount two separate horns at the prime focus. Apartment building Satellite Master TV Antenna (SMATV) systems often mount two feed horns side-by-side so as to enable reception of all 24 H and V transponders from a single satellite; with a small 2.3-3.5 meter dish with a fairly low focus to diameter (F/D) ratio, the focus is loose enough you can get away with it.

Note that there is also left-hand and right-hand circular polarization. Amateur satellites often employ circular polarization as well as do Intelsat hemispheric coverage international satellites. For receiving, one can install a dielectric plate at 45 degrees in a standard waveguide. I don't know about generating a circular-polarized signal in a waveguide; I've never had to do it. For HF antennas, you can do it with two Yagis 90 degrees apart fed with a phasing harness; I'm sure there is a similar method using waveguide sections.

--  
Bill Mayhew           NEOUCOM Computer Services Department  
Rootstown, OH 44272-9995 USA       phone: 216-325-2511  
wtm@uhura.neoucom.edu   amateur radio 146.58: N8WED/AA

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Date: 13 Jun 93 03:56:59 GMT  
From: swrinde!gatech!howland.reston.ans.net!noc.near.net!transfer.stratus.com!  
jjmhome!pig!die@network.UCSD.EDU  
To: packet-radio@ucsd.edu

References <1993Jun11.150745.9462@uhura.neoucom.edu>, <C8HLxB.BH2@zeno.fit.edu>,  
<1993Jun12.124123.21140@uhura.neoucom.edu>

Reply-To : stratus.com!jjmhome!pig!die

Subject : Re: Digital microwave project

In article <1993Jun12.124123.21140@uhura.neoucom.edu> wtm@uhura.neoucom.edu (Bill Mayhew) writes:

>at the prime focus. Apartment building Satellite Master TV Antenna  
>(SMATV) systems often mount two feed horns side-by-side so as to  
>enable reception of all 24 H and V trnasponders from a single  
>satellite; with a small 2.3-3.5 meter dish with a farily low focus  
>to diameter (F/D) ratio, the focus is loose enough you can get away  
>with it.

I have never seen this anywhere. The standard device for receiving both polarizations on one TVRO dish is called an orthomode feed; orthomode feeds use a common circular waveguide scalar horn (the thing with the rings of ridges) and two mode couplers (or probes) that couple to standard rectagular guide for input to the LNB's. Usually these are oriented at 90 degrees for the two polarities. A standard C band scalar horn is much bigger than the focal difraction disk of a typical .4 F/D dish and two side by side scalar horns wouldn't work at all. Neither one would get much of any signal.

What you do occasionally see is two (orthomode) scalar feeds each somewhat offset from the focus of the dish and each used to get signal from a separate satellite spaced nearby on the Clarke arc. This is not at all uncommon for cable or SMATV headends since most cable services are currently on satellites on the west end of the arc that are two or three degree apart, and the loss in gain due to coma from the 1 degree or 1.5 degree offset feed position on a 10 foot or 12 foot dish is not enough to cause serious signal degradation. There are some systems that use 3 feeds on one dish for the current constellation of west end of the arc cable satellites. This is also sometimes done with spherical rather than parabolic reflectors and sometimes the offset horns are oddly shaped to correct the phase distortion due to the offset from focus.

David I. Emery, Senior Technical Consultant (and notorious fraud)  
UUCP: ...uunet!stratus.com!jjmhome!pig!die Internet: die@world.std.com

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End of Packet-Radio Digest V93 #167

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